

We claim:

1 1. A hardware database management system for managing and manipulating
2 information stored in a database using standardized database statement, the hardware
3 database management system comprising:
4 a parser receiving the standardized database statements and converting the
5 standardized database statements into executable instructions and data objects;
6 an execution tree processor connected to the parse and receiving the executable
7 instructions from the parser, the execution tree processor creating execution trees from
8 the executable instructions and schedules the execution trees for execution; and
9 a graph engine connected to the execution tree processor, the graph engine
10 operable to manipulate the database as required by the executable instructions.

1 2. The hardware database management system of Claim 1 wherein the
2 information in the database is represented in memory in the form of graphs.

1 3. The hardware database management system of Claim 1 wherein the
2 execution tree processor is further operable to validate the executable instructions
3 received from the parser.

1 4. The hardware database management system of Claim 1 wherein the
2 execution tree processor is further operable to ensure data integrity in the database and to
3 control access to restricted information in the database.

1 5. The hardware database management system of Claim 1 wherein the
2 execution tree processor further comprises at least one function engine, the function
3 engine operable to perform functions in accordance with the executable instructions.

1 6. The hardware database management system of Claim 1 wherein the
2 standardized database statements are Structured Query Language statements.

1 7. The hardware database management system of Claim 1 wherein the
2 execution tree processor is further operable to continually optimize the execution trees.

1 8. The hardware database management system of Claim 1 wherein the
2 manipulation of the database by the graph engine includes reading information from the
3 database, writing information into the database and altering information in the database.

1 9. The hardware database management system of Claim 1 wherein the
2 execution tree processor may call routines from an external microprocessor.

1 10. A data flow engine for implementing a database management system in
2 hardware, the database management system operable to process standardized database
3 statements against a database of information, the data flow processor comprising:
4 a parsing engine operable to convert the standardized database statements into
5 executable instructions; and
6 an execution engine receiving the executable instructions from the parsing engine,
7 the execution engine validating the executable instructions, and building execution trees
8 to schedule the executable instructions, the execution engine further operable to ensure
9 the integrity of the information in the database and to control access to restricted
10 information in the database; and
11 a graph engine operable to execute the executable instructions that require the
12 manipulation of the information in the database.

1 11. The hardware database management system of Claim 10 wherein the
2 information in the database is stored in random access memory accessible to the graph
3 engine.

1 12. The hardware database management system of Claim 10 wherein the
2 database is represented in memory attached to multiple data flow engines, and wherein
3 the data flow engine may access information by sending requests to a second data flow
4 engine.

1 13. The hardware database management system of Claim 10 wherein the
2 execution tree processor further comprises at least one function engine, the function
3 engine operable to perform functions in accordance with the executable instructions.

1 14. The hardware database management system of Claim 10 wherein the
2 standardized database statements are Structured Query Language statements.

1 15. The hardware database management system of Claim 10 wherein the
2 standardized database statements are Xtensible Markup Language.

1 16. The hardware database management system of Claim 10 wherein the
2 execution tree processor is further operable to continually optimize the execution trees.

1 17. The hardware database management system of Claim 10 wherein the
2 manipulation of the database by the graph engine includes reading information from the
3 database, writing information into the database and altering information in the database.

1 18. The hardware database management system of Claim 10 wherein the
2 execution tree processor may call routines from an external microprocessor.